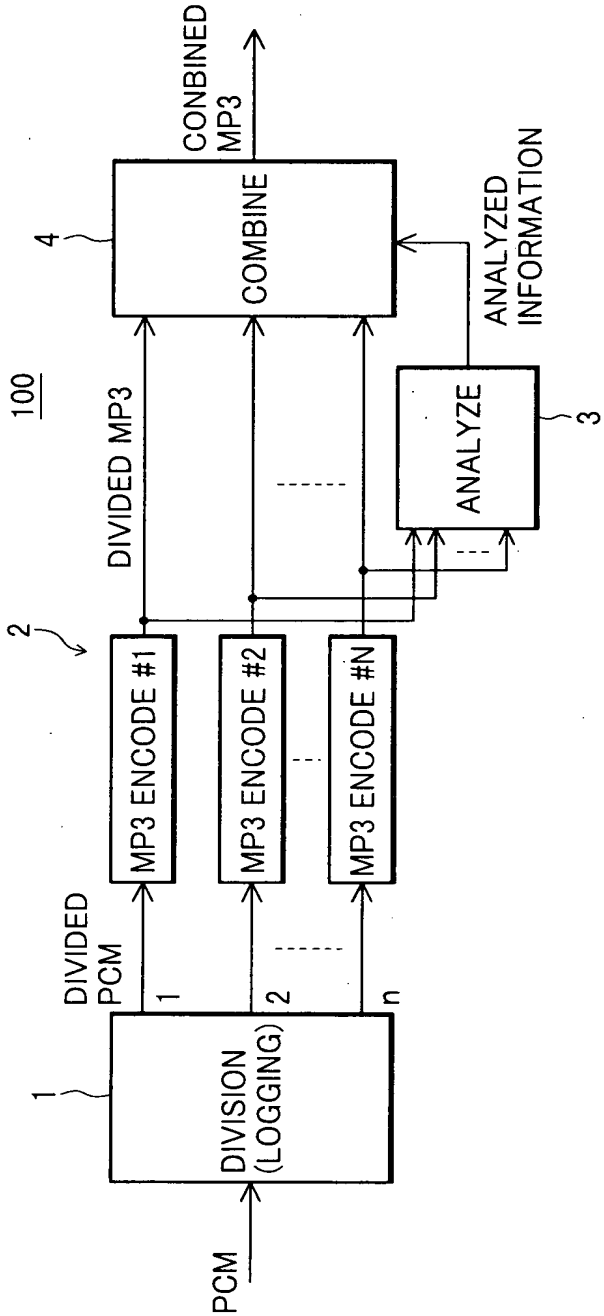

100
PCM
1
DIVISION (LOGGING)
DIVIDED PCM
1
2
n
2
MP3 ENCODE #1
MP3 ENCODE #2
MP3 ENCODE #N
DIVIDED MP3
3
ANALYZE
ANALYZED INFORMATION
4
COMBINE
CONBINED MP3

FIG.1A

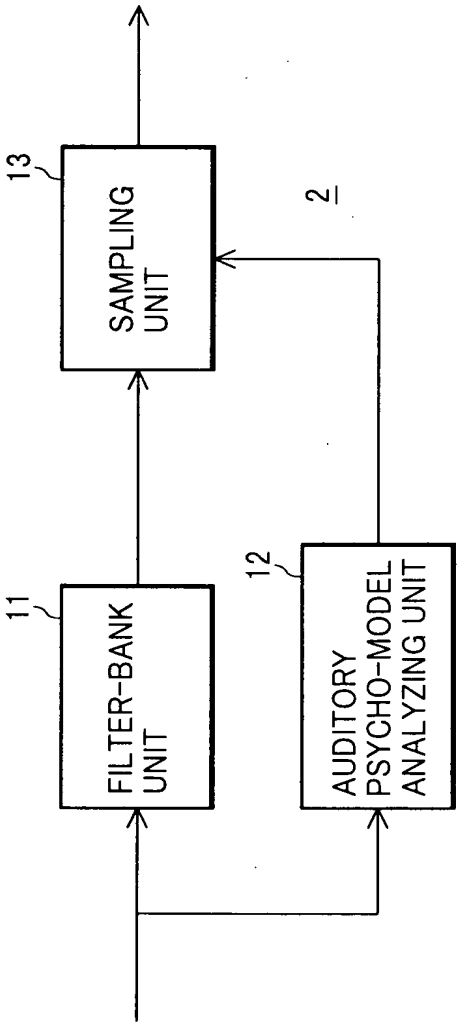

2
13
SAMPLING UNIT
11
FILTER-BANK UNIT
12
AUDITORY PSYCHO-MODEL ANALYZING UNIT

FIG.1B

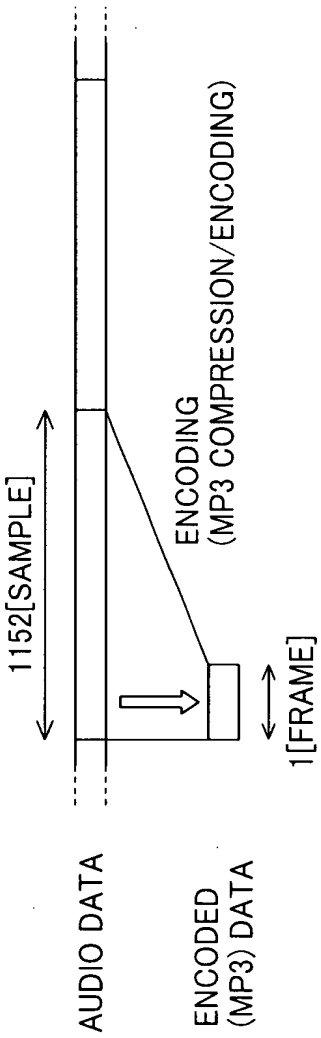


FIG.2A

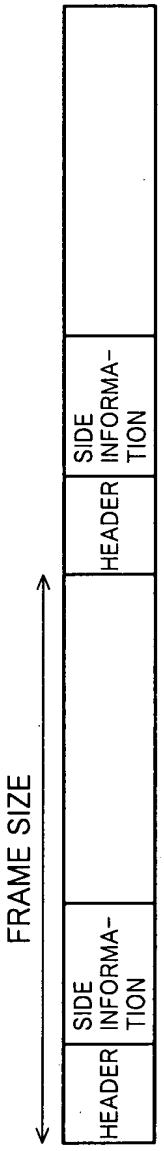


FIG.2B

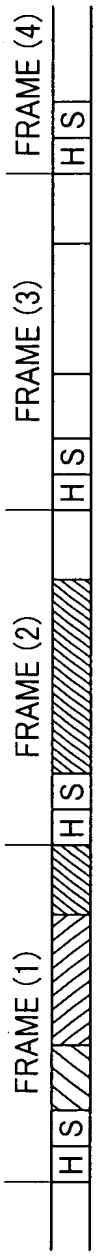


FIG.2C

FIG.3

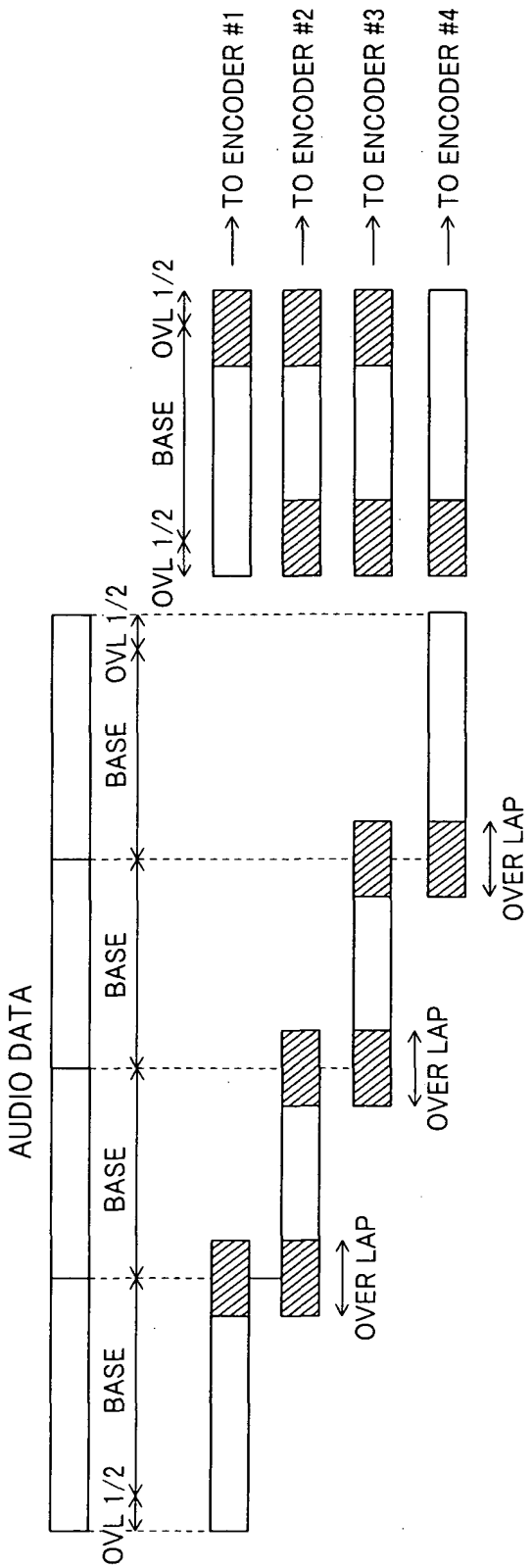

AUDIO DATA
OVL 1/2
BASE
BASE
BASE
OVL 1/2
OVL 1/2
BASE
OVL 1/2
OVER LAP
OVER LAP
OVER LAP
TO ENCODER #1
TO ENCODER #2
TO ENCODER #3
TO ENCODER #4

FIG.4A

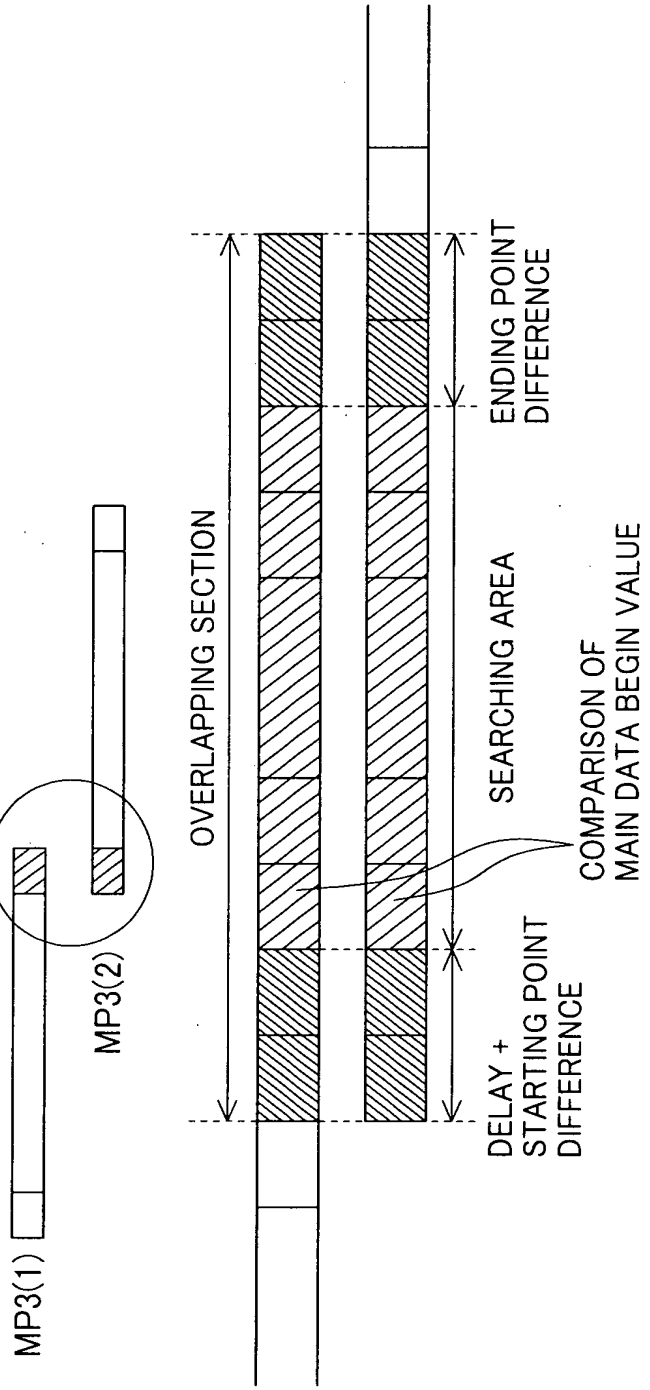

MP3(1)
MP3(2)
OVERLAPPING SECTION
ENDING POINT DIFFERENCE
SEARCHING AREA
COMPARISON OF MAIN DATA BEGIN VALUE
DELAY + STARTING POINT DIFFERENCE

FIG.4B

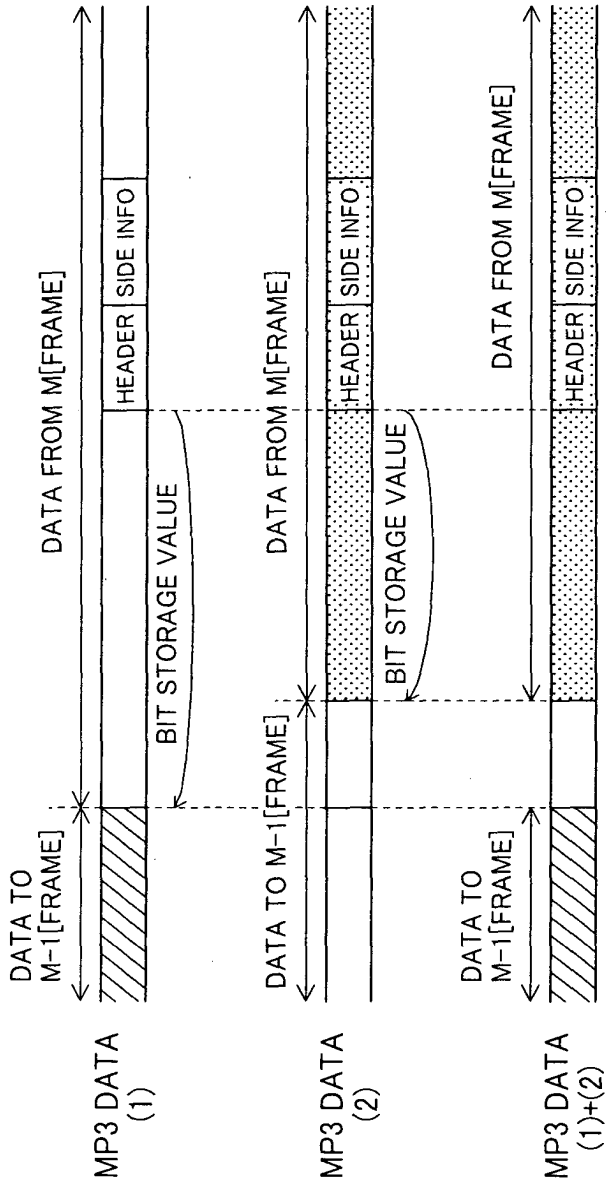
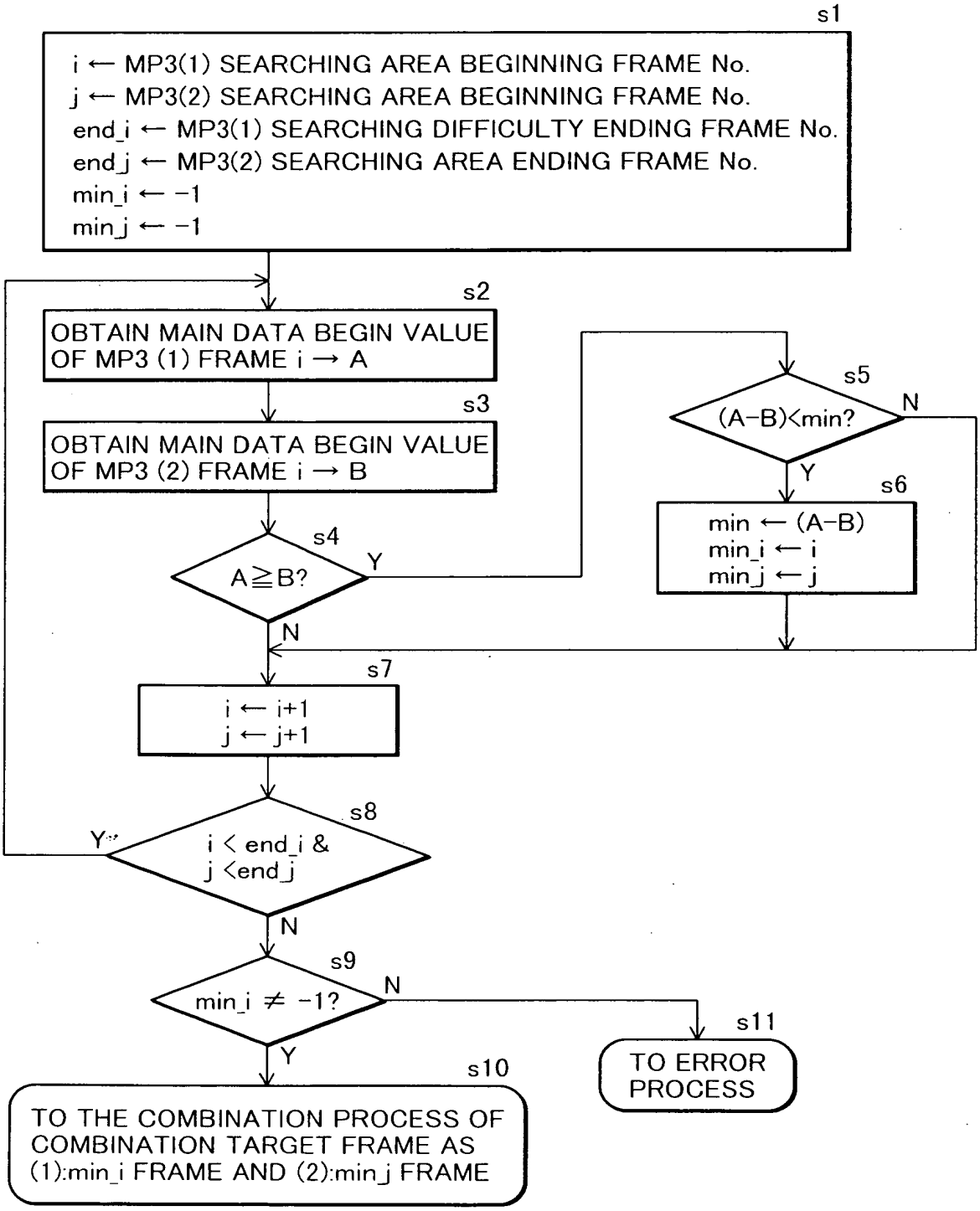

DATA TO M-1[FRAME]
DATA FROM M[FRAME]
HEADER
SIDE INFO
BIT STORAGE VALUE
MP3 DATA (1)
DATA TO M-1[FRAME]
DATA FROM M[FRAME]
HEADER
SIDE INFO
BIT STORAGE VALUE
MP3 DATA (2)
DATA TO M-1[FRAME]
DATA FROM M[FRAME]
HEADER
SIDE INFO
MP3 DATA (1)+(2)

FIG.5


s1
i ← MP3(1) SEARCHING AREA BEGINNING FRAME No.
j ← MP3(2) SEARCHING AREA BEGINNING FRAME No.
end_i ← MP3(1) SEARCHING DIFFICULTY ENDING FRAME No.
end_j ← MP3(2) SEARCHING AREA ENDING FRAME No.
min_i ← −1
min_j ← −1
s2
OBTAIN MAIN DATA BEGIN VALUE OF MP3 (1) FRAME i → A
s3
OBTAIN MAIN DATA BEGIN VALUE OF MP3 (2) FRAME i → B
s4
A≧B?
Y
N
s5
(A−B)<min?
N
Y
s6
min ← (A−B)
min_i ← i
min_j ← j
s7
i ← i+1
j ← j+1
s8
i < end_i &
j <end_j
Y
N
s9
min_i ≠ −1?
N
Y
s10
TO THE COMBINATION PROCESS OF COMBINATION TARGET FRAME AS (1):min_i FRAME AND (2):min_j FRAME
s11
TO ERROR PROCESS

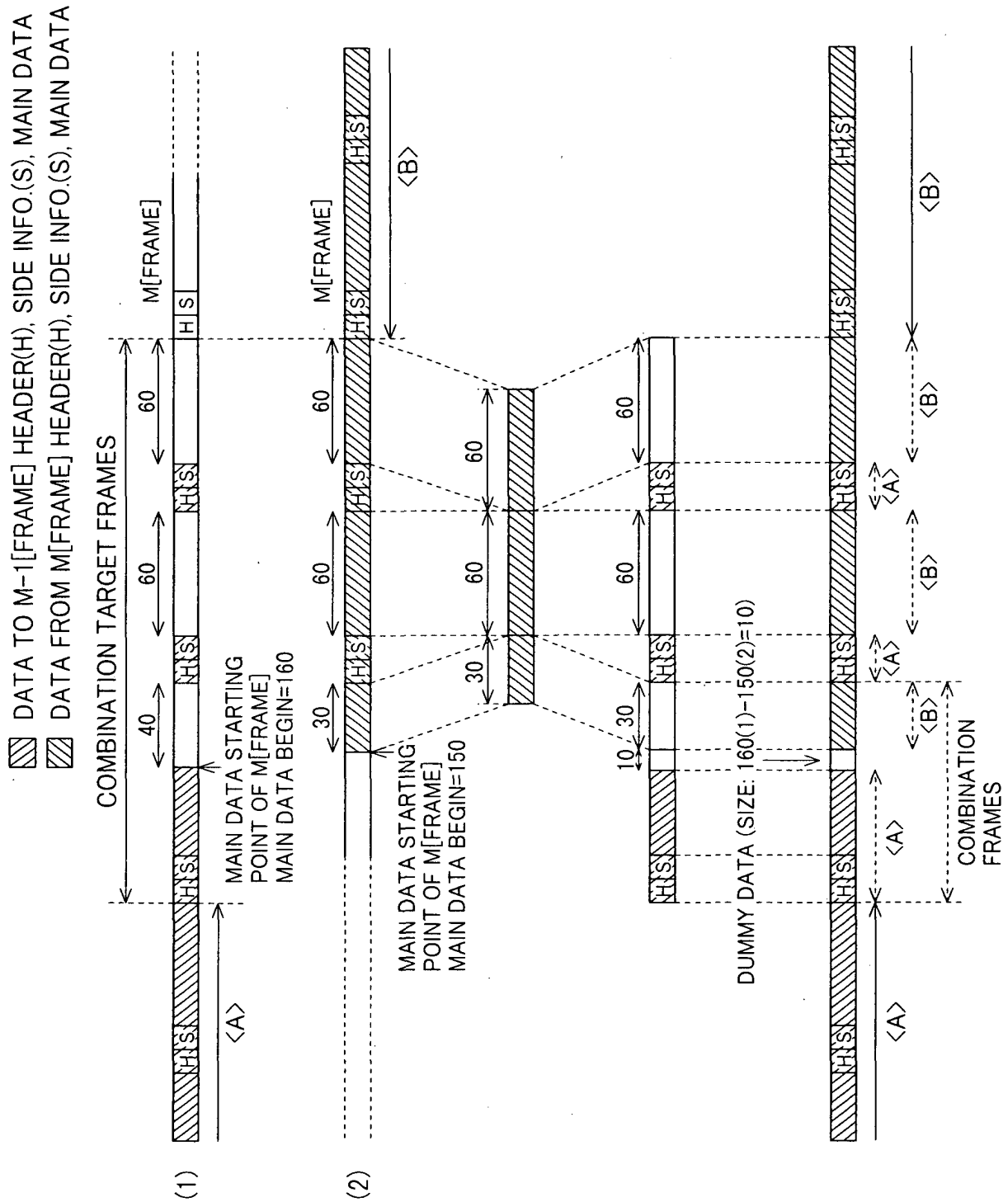

DATA TO M-1[FRAME] HEADER(H), SIDE INFO.(S), MAIN DATA
DATA FROM M[FRAME] HEADER(H), SIDE INFO.(S), MAIN DATA
COMBINATION TARGET FRAMES
M[FRAME]
MAIN DATA STARTING POINT OF M[FRAME]
MAIN DATA BEGIN=160
MAIN DATA STARTING POINT OF M[FRAME]
MAIN DATA BEGIN=150
DUMMY DATA (SIZE: 160(1)-150(2)=10)
COMBINATION FRAMES
(1)
(2)
<A>
<B>
H
S
40
60
30
10

FIG.6

FIG.7

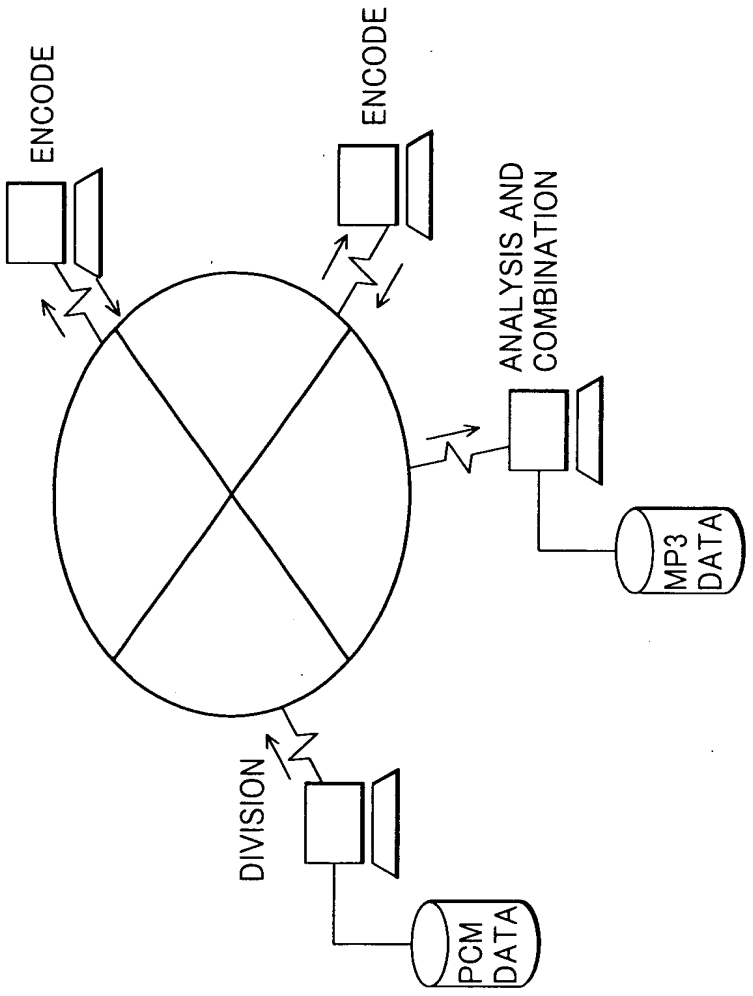
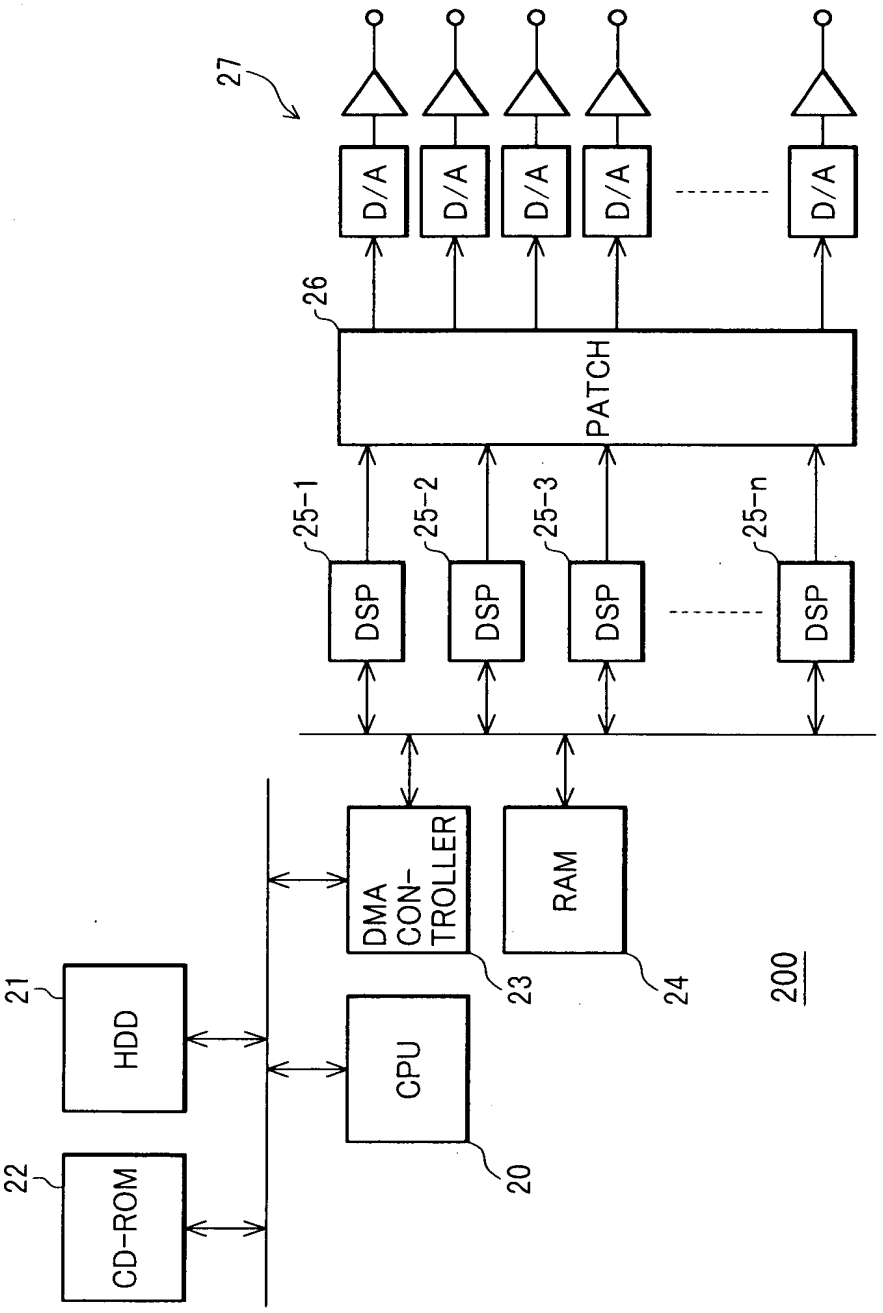

ENCODE
ENCODE
ANALYSIS AND COMBINATION
MP3 DATA
DIVISION
PCM DATA

FIG.8


27
D/A
D/A
D/A
D/A
D/A
26
PATCH
25-1
25-2
25-3
25-n
DSP
DSP
DSP
DSP
DMA CON-TROLLER
RAM
23
24
200
21
HDD
22
CD-ROM
CPU
20

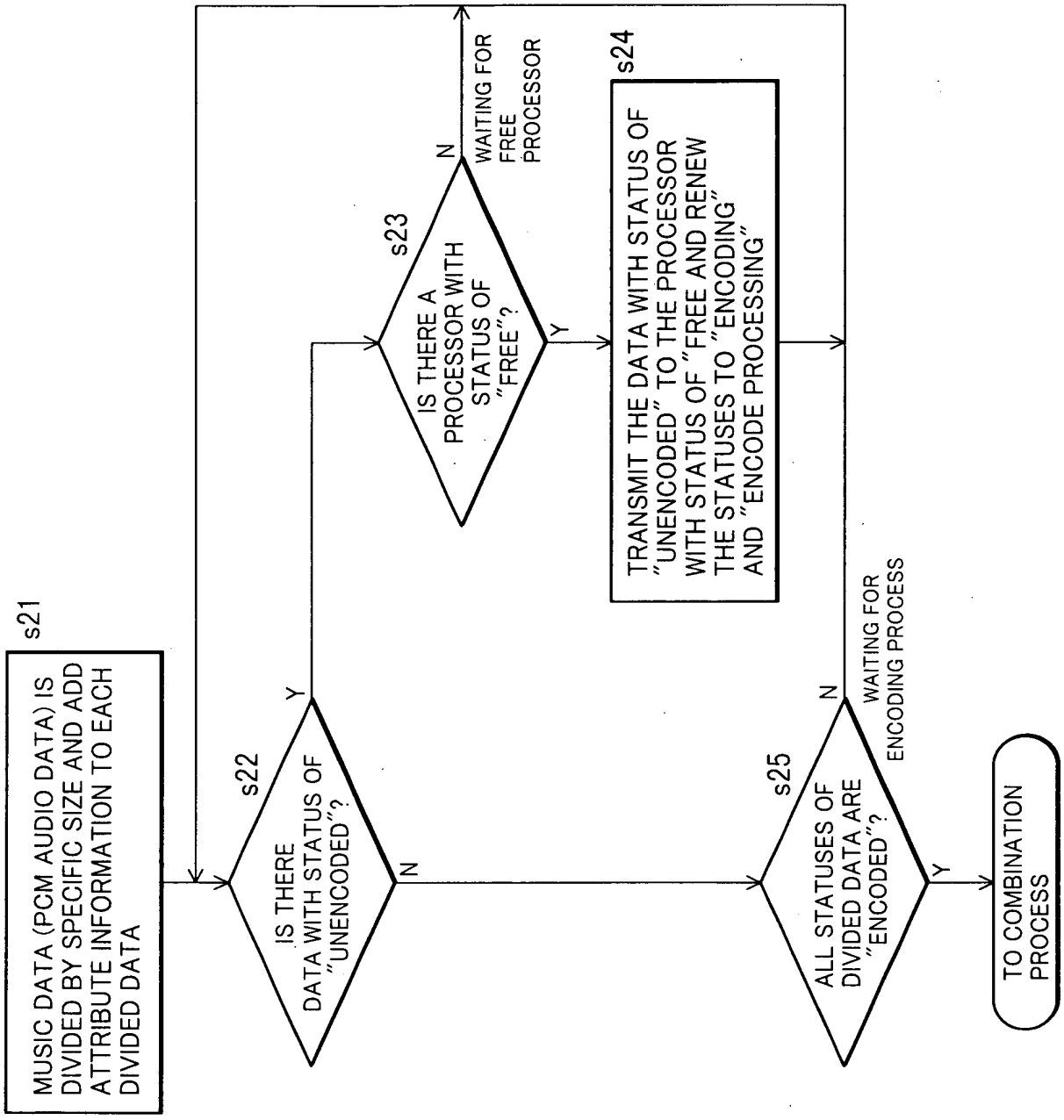
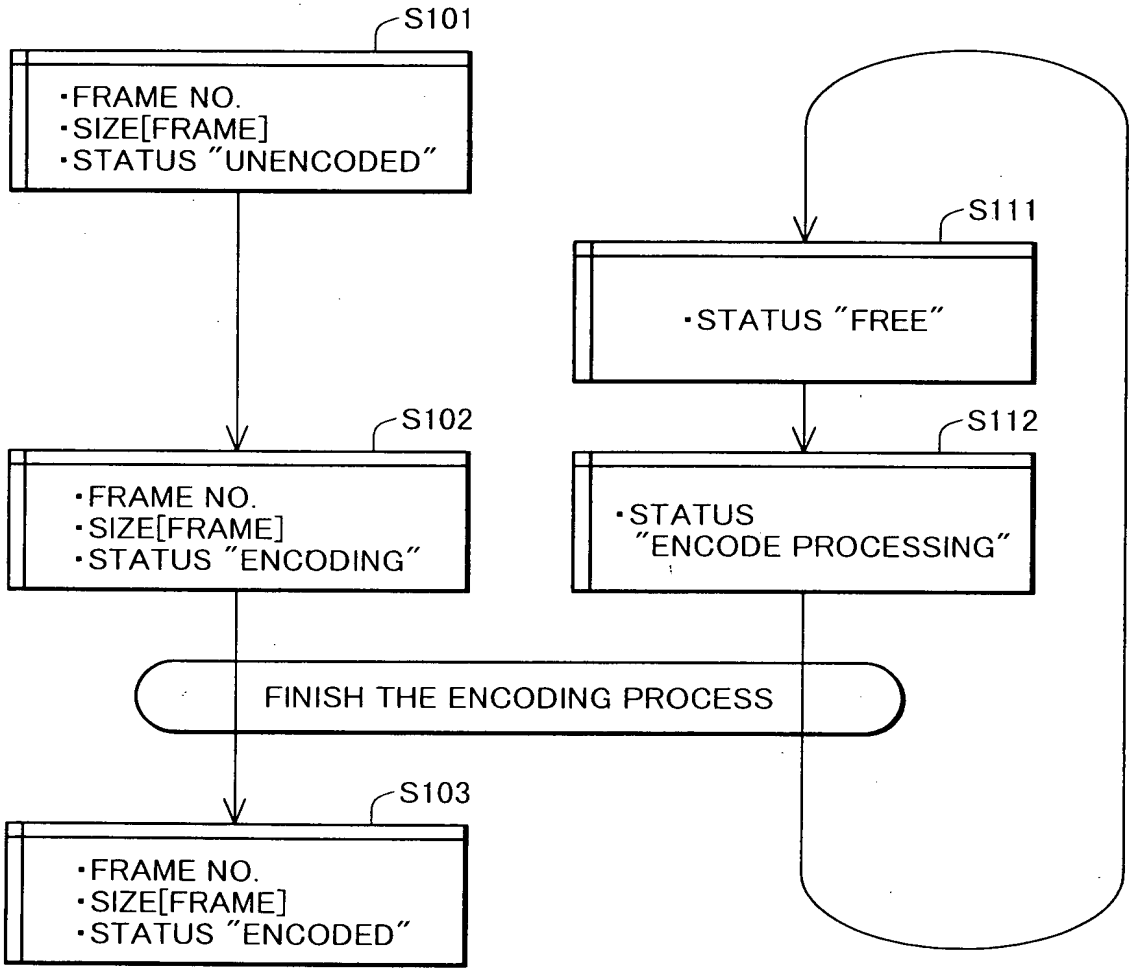

s21
MUSIC DATA (PCM AUDIO DATA) IS DIVIDED BY SPECIFIC SIZE AND ADD ATTRIBUTE INFORMATION TO EACH DIVIDED DATA
s22
IS THERE DATA WITH STATUS OF "UNENCODED"?
Y
N
s23
IS THERE A PROCESSOR WITH STATUS OF "FREE"?
N
WAITING FOR FREE PROCESSOR
Y
s24
TRANSMIT THE DATA WITH STATUS OF "UNENCODED" TO THE PROCESSOR WITH STATUS OF "FREE AND RENEW THE STATUSES TO "ENCODING" AND "ENCODE PROCESSING"
s25
ALL STATUSES OF DIVIDED DATA ARE "ENCODED"?
N
WAITING FOR ENCODING PROCESS
Y
TO COMBINATION PROCESS

FIG.9A

FIG.9B


S101
·FRAME NO.
·SIZE[FRAME]
·STATUS "UNENCODED"
S111
·STATUS "FREE"
S102
·FRAME NO.
·SIZE[FRAME]
·STATUS "ENCODING"
S112
·STATUS
"ENCODE PROCESSING"
FINISH THE ENCODING PROCESS
S103
·FRAME NO.
·SIZE[FRAME]
·STATUS "ENCODED"

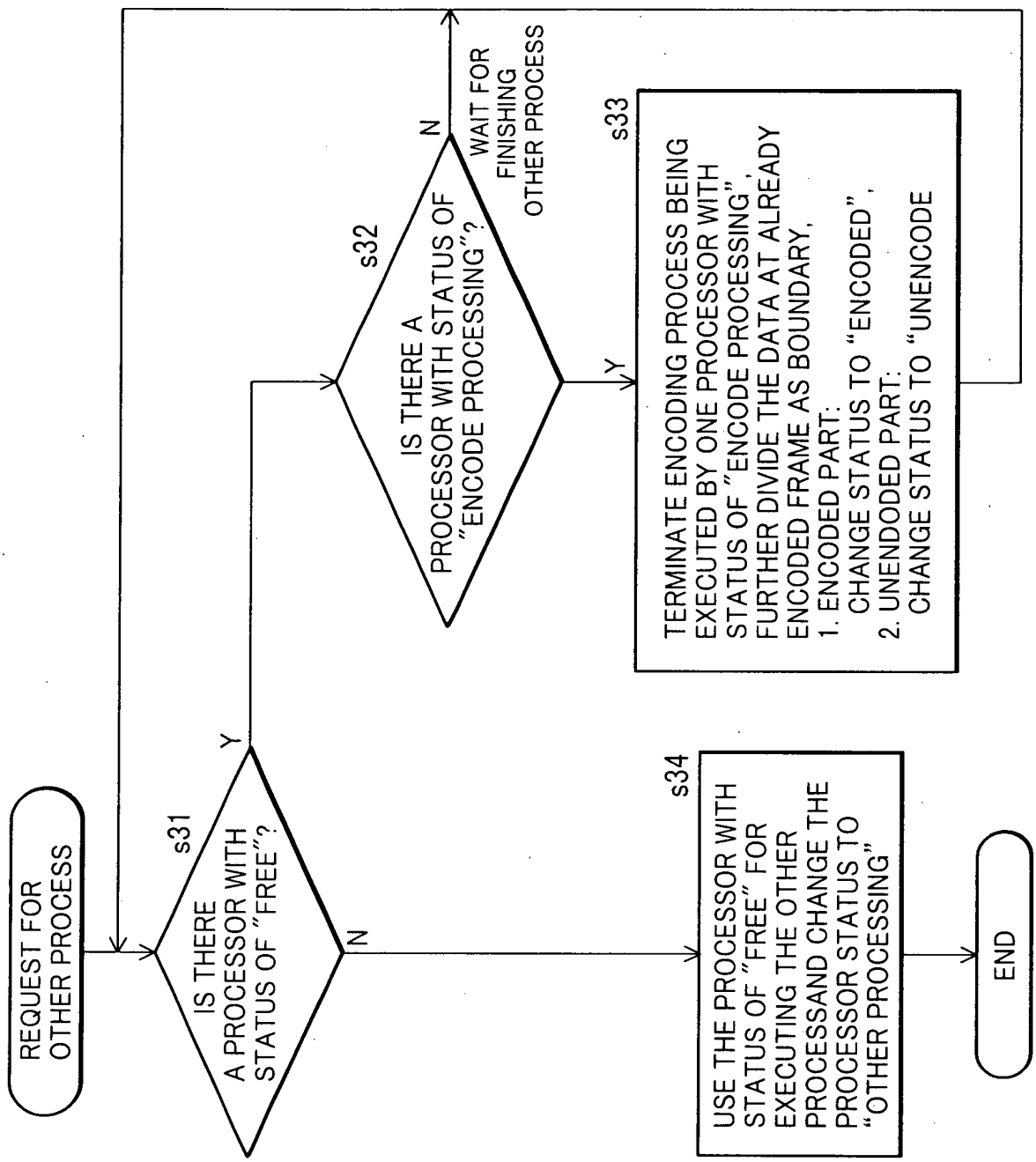

REQUEST FOR OTHER PROCESS
s31
IS THERE A PROCESSOR WITH STATUS OF "FREE"?
Y
N
s32
IS THERE A PROCESSOR WITH STATUS OF "ENCODE PROCESSING"?
N
WAIT FOR FINISHING OTHER PROCESS
Y
s33
TERMINATE ENCODING PROCESS BEING EXECUTED BY ONE PROCESSOR WITH STATUS OF "ENCODE PROCESSING", FURTHER DIVIDE THE DATA AT ALREADY ENCODED FRAME AS BOUNDARY,
1. ENCODED PART:
CHANGE STATUS TO "ENCODED",
2. UNENDODED PART:
CHANGE STATUS TO "UNENCODE
s34
USE THE PROCESSOR WITH STATUS OF "FREE" FOR EXECUTING THE OTHER PROCESSAND CHANGE THE PROCESSOR STATUS TO "OTHER PROCESSING"
END

FIG.10A

FIG.10B

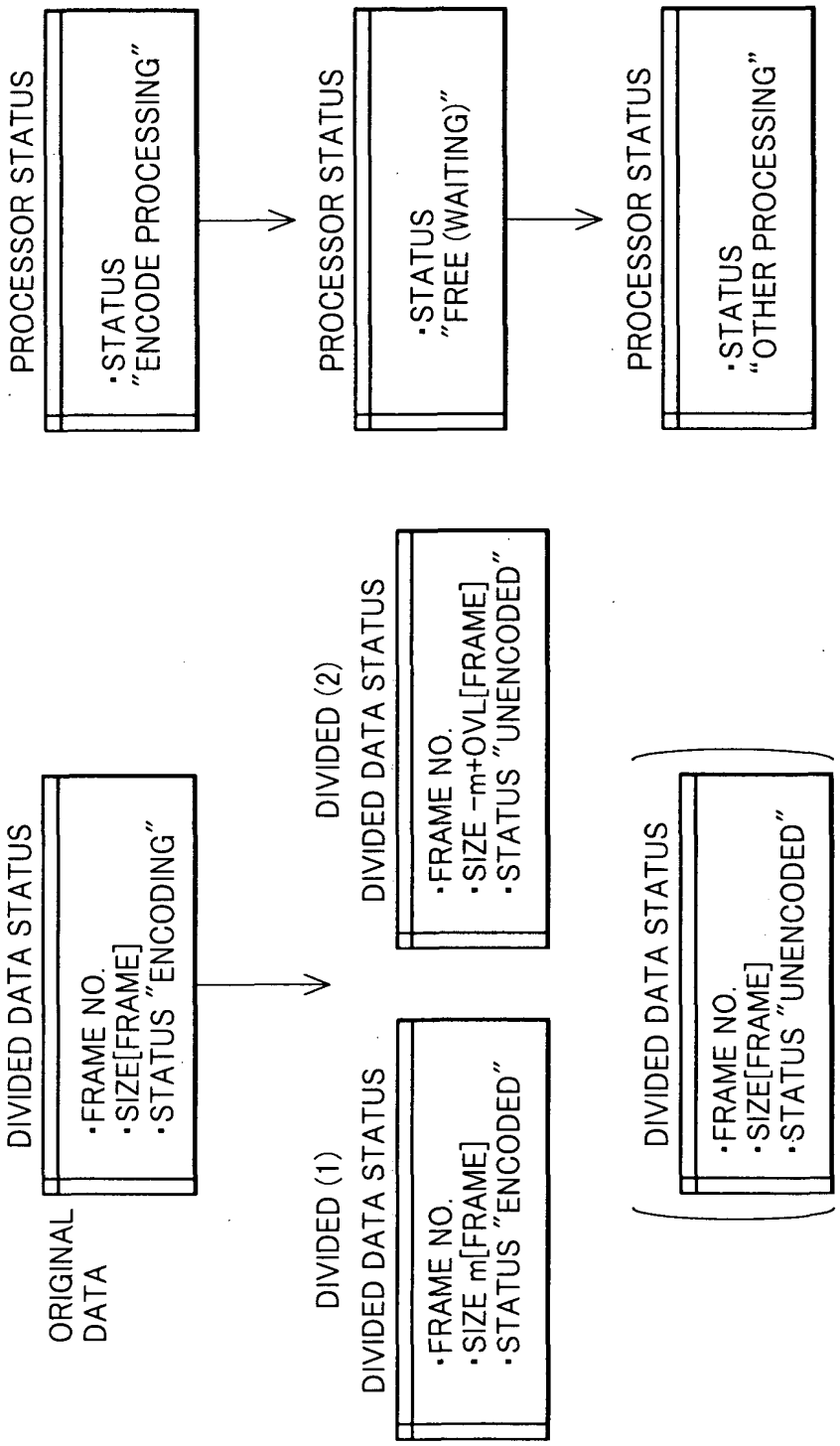

PROCESSOR STATUS
·STATUS
"ENCODE PROCESSING"
PROCESSOR STATUS
·STATUS
"FREE (WAITING)"
PROCESSOR STATUS
·STATUS
"OTHER PROCESSING"
ORIGINAL DATA
DIVIDED DATA STATUS
·FRAME NO.
·SIZE[FRAME]
·STATUS "ENCODING"
DIVIDED (1)
DIVIDED DATA STATUS
·FRAME NO.
·SIZE m[FRAME]
·STATUS "ENCODED"
DIVIDED (2)
DIVIDED DATA STATUS
·FRAME NO.
·SIZE -m+OVL[FRAME]
·STATUS "UNENCODED"
DIVIDED DATA STATUS
·FRAME NO.
·SIZE[FRAME]
·STATUS "UNENCODED"

FIG.10C

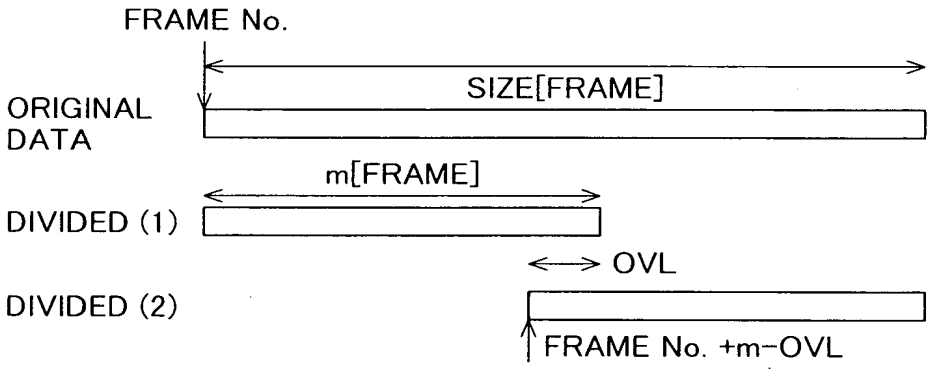

FRAME No.
SIZE[FRAME]
ORIGINAL DATA
m[FRAME]
DIVIDED (1)
OVL
DIVIDED (2)
FRAME No. +m−OVL

FIG.11

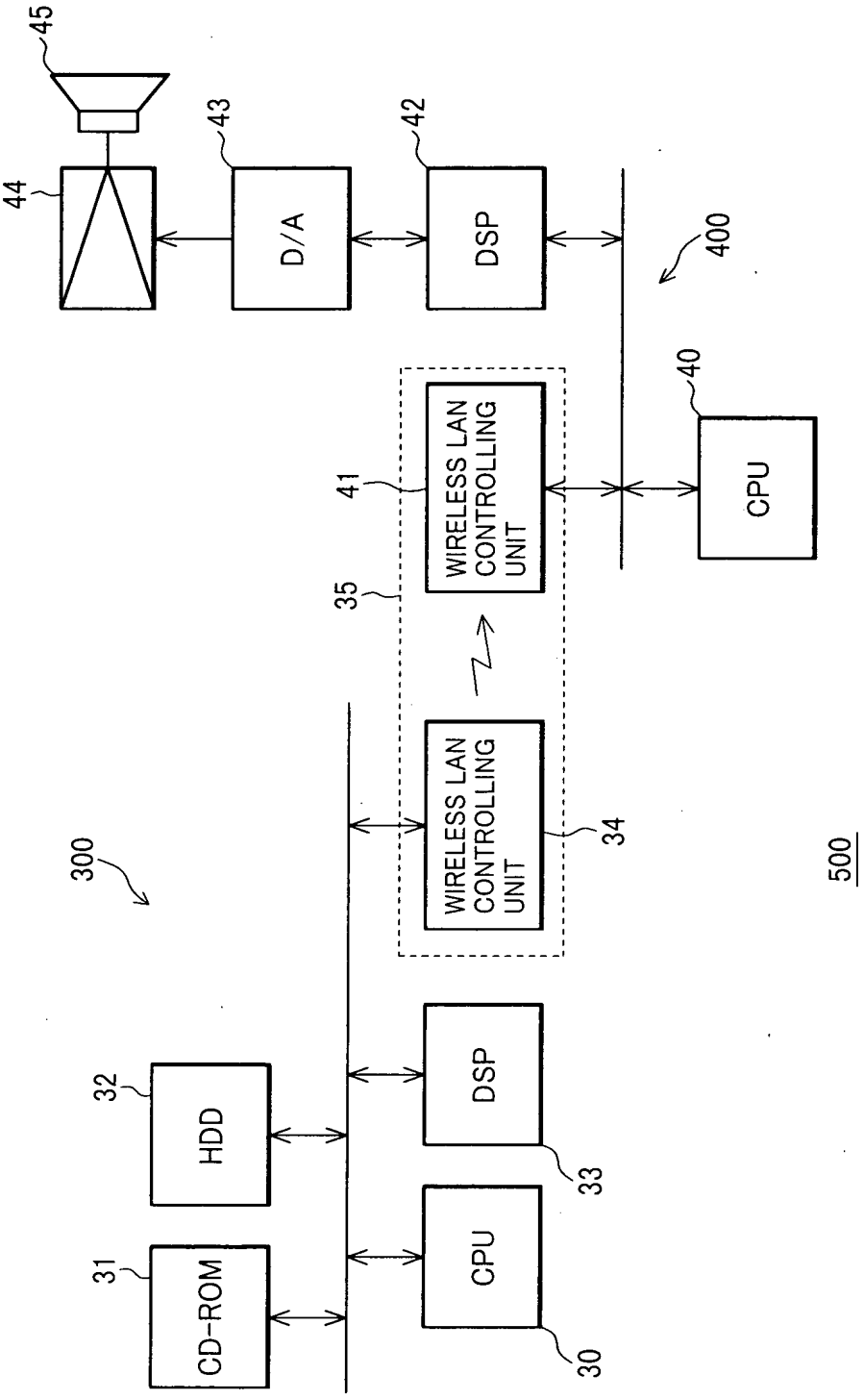

45
44
43
D/A
42
DSP
400
40
CPU
41
WIRELESS LAN CONTROLLING UNIT
35
WIRELESS LAN CONTROLLING UNIT
34
300
500
32
HDD
DSP
33
31
CD-ROM
CPU
30

FIG.12

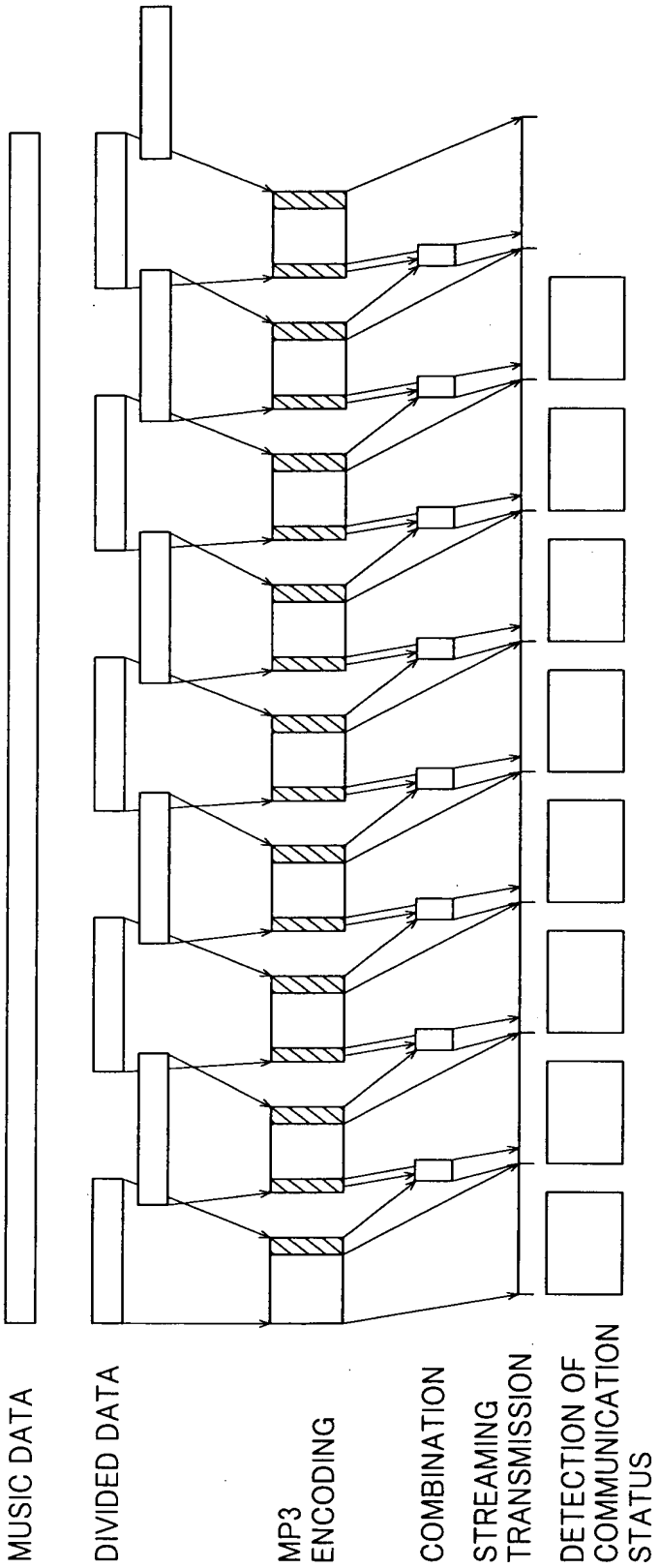
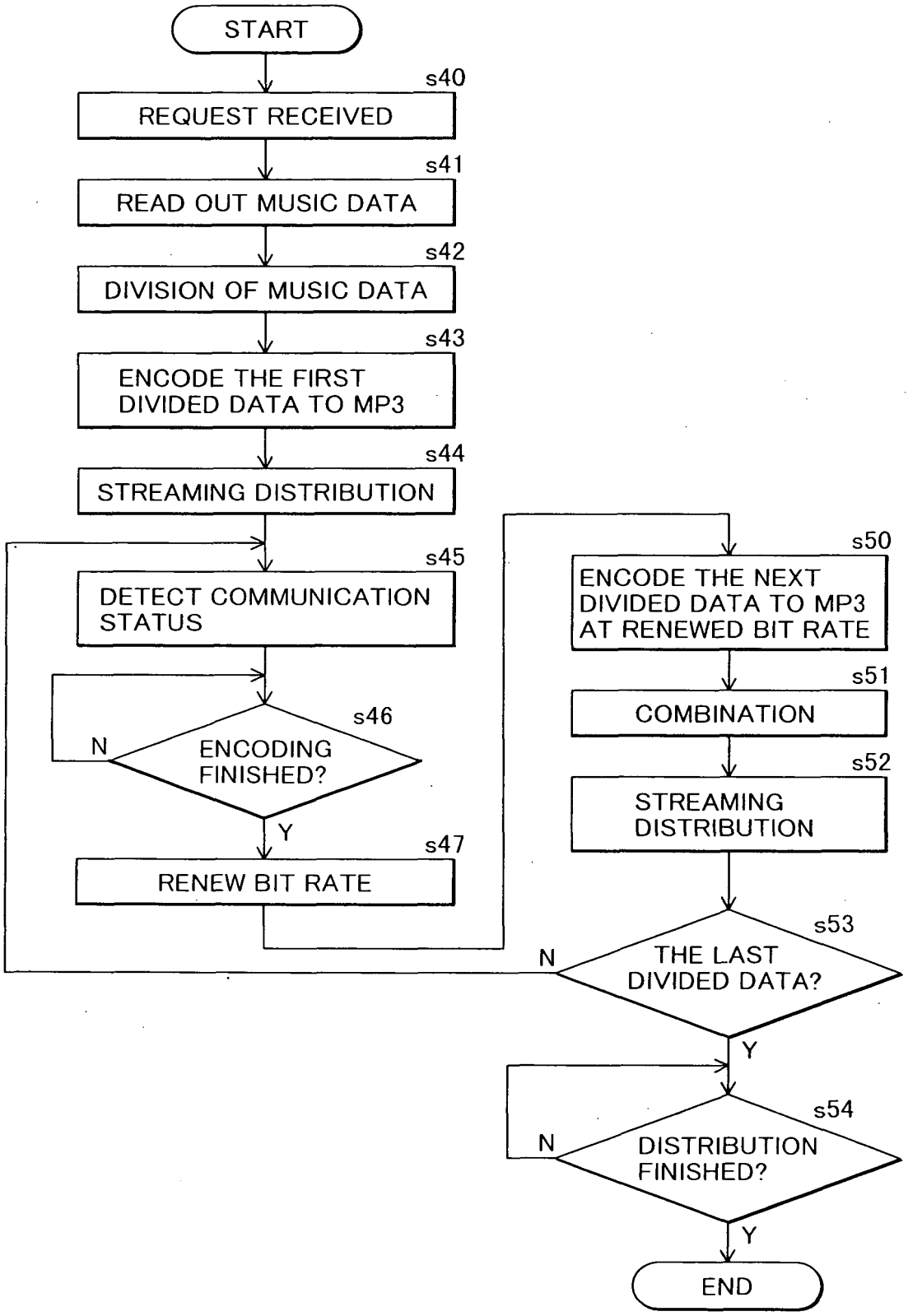

MUSIC DATA
DIVIDED DATA
MP3 ENCODING
COMBINATION
STREAMING TRANSMISSION
DETECTION OF COMMUNICATION STATUS

FIG.13


START
s40
REQUEST RECEIVED
s41
READ OUT MUSIC DATA
s42
DIVISION OF MUSIC DATA
s43
ENCODE THE FIRST DIVIDED DATA TO MP3
s44
STREAMING DISTRIBUTION
s45
DETECT COMMUNICATION STATUS
s46
ENCODING FINISHED?
N
Y
s47
RENEW BIT RATE
s50
ENCODE THE NEXT DIVIDED DATA TO MP3 AT RENEWED BIT RATE
s51
COMBINATION
s52
STREAMING DISTRIBUTION
s53
THE LAST DIVIDED DATA?
N
Y
s54
DISTRIBUTION FINISHED?
N
Y
END